

Automated Monitoring Tools for the CMS Muon System Based on Machine Learning Algorithms

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Monitoring the quality of the data being collected by the CMS Muon system to ensure that it fulfills the requirements needed to be used for physics analyses is a time-consuming and labor-intensive task. The CMS Muon group is developing a reliable and robust tool that will make use of automated statistical tests and modern machine learning algorithms to reduce the resources needed to run and monitor the muon sub-detectors. The challenge in the development of such a tool is that the running conditions of the LHC experiments are not static, causing the quantities used for data monitoring to evolve. Furthermore, the tool must be applicable to the monitoring of all four muon sub-detectors (Cathode Strip Chambers, Drift Tube chambers, Gas Electron Multiplier chambers, Resistive Plate Chambers), which all depend on different detector technologies and are located in different geometrical areas of the detector. We will present an overview of the current tools and workflows used for monitoring, together with the status of the state-of-the-art developments towards the automated monitoring that we will implement for the future LHC runs.

Author: GOH, Junghwan (Hanyang University (KR))

Presenter: GOH, Junghwan (Hanyang University (KR))

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